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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/767,104 | 01/22/2001 | Sreenath B. Gupta | ANL-IN-99-056 | 9114 |

7590 06/04/2003

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| EXAMINER |
|---|
| SEVER, ANDREW T |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2851 | |

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/767,104 | GUPTA ET AL. | |
| | Examiner | Art Unit | |
| | Andrew T Sever | 2851 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**P riod for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4 and 6-20* is/are rejected.

7)☒ Claim(s) *3 and 5* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4, 6, 12-14, 16, 17 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Snelling et al. (SAE technical paper as provided by the applicant).

Snelling et al. as provided by the applicant, teaches in figure 5 and on page 5 starting at the bottom paragraph of the first column, an instrument for measuring particles of combustion exhausts comprising a laser for producing a high intensity laser pulse, a sample cell for receiving combustion exhaust input and the high intensity laser pulse and at least one detector (three photo-multiplier tubes PMT detectors as is claimed in applicant's claims 13 and 14) for detecting a signal generated by particles in the received combustion exhaust input, the signal includes laser induced incandescence (LII). A plurality of optical elements couple the high intensity laser pulse to the sample cell and are specifically a cylindrical lens and polarizers as is claimed in applicant's claim 2. Further a plurality of focusing elements which comprise of spherical lens couple the signal generated by the particles to the at least one detector as is claimed by applicant's claim 4. Snelling further teaches that the three photo multipliers are equipped with narrowband interference filters as is claimed by applicant's claim 6. With regards to applicant's claim 12, Snelling teaches on page 2, column 1 bottom paragraph that the

tests were performed during a transient test procedure. With regards to applicant's claim 16, figure 5 shows that the heated exhaust first enters an insulated mini-dilution tunnel coupling the combustion exhaust input to the sample cell. With regards to applicant's claims 17 and 20, Snelling's instrument is described in order to explain an experiment that Snelling had ran and therefore the method also exists and is explained by Snelling.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 7-11, 15, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Snelling et al. (SAE technical paper as provided by the applicant) as applied to claims 1, 2, 4, 6, 12-14, 16, 17 and 20 above, and further in view of US patent 6,154,277 to Snelling et al. (which will be referred to as the '4277' patent in this action.)

Snelling et al. as provided by the applicant teaches an instrument for measuring particles of combustion exhaust which comprises a laser for producing a high intensity laser pulse, a sample cell for receiving combustion exhaust input and the high intensity laser pulse, and at least one detector for detecting a signal generated by the particles in the received combustion exhaust input, where the signal includes laser induced incandescence (LII.) Snelling further teaches optical elements coupling the laser pulse to the sample cell and then separate optical elements coupling the signal generated by the

particles to the detector where the former are in part a cylindrical lens and the latter are a spherical lens. Snelling however does not specifically teach conditioning electronics being coupled to the detectors.

The '4277' patent teaches a similar system and method to the Snelling article. In describing the method of the invention in column 8 lines 36-62, the '4277' patent teaches the use of signal condition electronics coupled to a time gated integrator which has a duration preferably beginning at the peak intensity as is claimed by applicant's claim 8. Figure 6 further illustrates the method of determining particle volume fraction, which the '4277' conditioning electronics uses, which includes calibration multiplier as is claimed by applicant's claim 9. The '4277' patent teaches in column 3 line 65 through column 4 line 9, that the processor and mathematical model allow for a more portable apparatus and avoid the need for calibration using a source of a known particle volume fraction. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include conditioning electronics with a peak detector and a calibration multiplier in Snelling's system and method.

With regards to applicant's claim 10 and 11, it is well known in the art, that in order for the instrument just described to be useful it must output the results of its measurements to a display for a user to see the results, further the '4277' patent teaches that some of the data calculated is mass concentration, number density, and particle size. For example figure 5 of Snelling shows that the results are transmitted to a computer, which normally would display them on its monitor.

***Allowable Subject Matter***

5. Claim 3 and 5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: Claims 3 and 5 claim that the optical elements coupling the high intensity laser pulse to the sample cell and then coupling the signal generated by the particles to the at least one detector comprise a plurality of lenses each. This was not found in the prior art of record. All of the Snelling et al. references show only single lenses at each position. US 5,142,140 to Yamazaki teaches 2 cylindrical lenses (part 2 in figure 1) in an apparatus for counting particles suspended in a fluid having a polarizing beam splitter, however Yamazaki does not give a reason for using two instead of one and accordingly there is no motivation to combine this teaching of Yamazaki with Snelling et al. other then hindsight. Further no reference was found that taught the use of multiple spherical lenses for receiving the signal generated by the particles. Since there is no motivation to modify Snelling to use a plurality of lenses at either position, claims 3 and 5 would be allowable if re-written in, independent form including the subject matter of their rejected base claims.

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US patent 6,181,419 to Snelling et al. This patent is similar to US 6,154,277 cited above.

US patent 6,473,178 to Shimaoka

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew T Sever whose telephone number is 703-305-4036. The examiner can normally be reached M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russell Adams can be reached at 703-308-2847. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

AS
June 1, 2003

Rodney Fuller
Primary Examiner